

## CLAIMS

We claim:

Claim 1. A wheel cleaning composition, comprising an effective amount of a dirt complexing polymer to complex with dirt particles is selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), and combinations thereof; and  
a surfactant.

Claim 2. The wheel cleaning composition of claim 1, wherein said surfactant is a nonionic surfactant or cationic surfactant.

Claim 3. The wheel cleaning composition of claim 1, wherein said surfactant is selected from the group consisting of BEROL 226, PLUROFAC D25, and combinations thereof.

Claim 4. The wheel cleaning composition of claim 1, including a quaternary ammonium compound containing from 8 to 12 carbons of which R is the linear primary alcohol and n is the total number of moles of ethylene oxide in accordance with the formula  $RO(CH_2CH_2O)_nH$  wherein R is selected from the group consisting of a linear  $C_8$ ,  $C_9$ ,  $C_{10}$ ,  $C_{11}$ ,  $C_{12}$  Poly(2) or (4) or (6) or (8) oxyethylene  $C_{8-12}$  alcohol; linear  $C_9$ ,  $C_{10}$ ,  $C_{11}$  Poly(2.5) or (6) or (8) oxyethylene  $C_{9-11}$  alcohol; linear  $C_{11}$  Poly(3) or (5) or (7) oxyethylene  $C_{11}$  alcohol; linear  $C_{12}/C_{13}$  Poly(1) or (3) or (5) or (6.5) oxyethylene  $C_{12-13}$  alcohol; linear  $C_{12}$ ,  $C_{13}$ ,  $C_{14}$ ,  $C_{15}$  Poly(3) or (7) or (9) or (12) oxyethylene  $C_{12-15}$  alcohol; and linear  $C_{14}/C_{15}$  Poly(2.5) or (7) or (13) oxyethylene  $C_{14-15}$  alcohol.

Claim 5. The wheel cleaning composition of claim 1, including a compound selected from

the group consisting of an amine oxide, a nonyl phenol ethoxylate, an ethoxylated alcohol, and ethoxylate propoxylated block co-polymer, and a diethanolamide.

Claim 6. The wheel cleaning composition of claim 1, including a conventional wheel cleaning agent comprising an acid-based formulation.

5            Claim 7. The wheel cleaning composition of claim 6, including wherein said acid-based formulation includes an acid cleaner selected from the group consisting of a phosphoric, a hydrochloric, a sulfuric, an oxalic, an acetic, a nitric, a hydroxyacetic, a hydrofluoric, a citric acid, and combinations thereof.

10           Claim 8. The wheel cleaning composition of claim 1, including a conventional wheel cleaning agent comprising an alkaline-based formulation.

15           Claim 9. The wheel cleaning composition of claim 8, including an effective amount of an alkaline cleaner capable of dissolving and emulsifying organic soils selected from the group consisting of a detergent, a water soluble organic solvent, a glycol ether, a sodium hydroxide solution, a potassium hydroxide solution, an alkaline silicate, an alkaline phosphate, and combinations thereof.

            Claim 10. The wheel cleaning composition of claim 9, wherein said detergent is an anionic synthetic detergent.

            Claim 11. The wheel cleaning composition of claim 10, wherein said anionic synthetic detergent is an alkyl sulfate.

20           Claim 12. The wheel cleaning composition of claim 11, wherein said alkyl sulfate is selected from the group consisting of a sodium lauryl sulfate, an alkyl ether sulfate, a linear alkyl benzene sulfonate, and combinations thereof.

Claim 13. The wheel cleaning composition of claim 9, wherein the amount of said alkaline cleaner is not critical so long as it remains soluble in an aqueous solution and is capable of dissolving and emulsifying organic soils.

5      Claim 14. The wheel cleaning composition of claim 9, wherein said alkaline cleaner is present in an amount of to 40 percent by weight.

Claim 15. The wheel cleaning composition of claim 1, including an organic solvent in an amount of to 50% by weight.

10      Claim 16. The wheel cleaning composition of claim 15, wherein said organic solvents are selected from the group consisting of an ethylene glycol, a propylene glycol, a glycol ether, a hydrocarbon, an alcohol, a n-methyl pyrrolidone, a ketone, a lactone, a terpene, and combinations thereof.

Claim 17. The wheel cleaning composition of claim 16, wherein said terpene is a limonene.

Claim 18. The wheel cleaning composition of claim 1, including a chelating agent for aiding in the removable of insoluble deposits of calcium and magnesium soaps and salts thereof.

15      Claim 19. The wheel cleaning composition of claim 18 wherein said chelating agent is ethylenediaminetetraacetic acid ("EDTA") and salts thereof.

Claim 20. The wheel cleaning composition of claim 19, wherein said salts of EDTA are selected from the group consisting of calcium disodium edentate, disodium edentate, tetrasodium edentate, trisodium sodium ferric edentate, dihydrogen ferrous edentate.

20      Claim 21. The wheel cleaning composition of claim 18 wherein said chelating agent comprises a disodium salts of magnesium, cobalt, manganese, copper, zinc, and nickel.

Claim 22. The wheel cleaning composition of claim 2 wherein said cationic surfactant, said nonionic surfactant, or said combination thereof is present in an amount of up to 20 percent by weight.

Claim 23. The wheel cleaning composition of claim 2 wherein said cationic surfactant, said nonionic surfactant, or said combination thereof is present in an amount of up to 0.01 to 5.0 percent by weight.

Claim 24. The wheel cleaning composition of claim 1 including a scouring agent.

Claim 25. The wheel cleaning composition of claim 1, wherein said scouring agent is selected from the group consisting of sodium metasilicate pentahydrate, sodium metasilicate anhydrous, and silicates.

Claim 26. The wheel cleaning composition of claim 25 wherein said scouring agent is present in an amount of up to 10 percent by weight.

Claim 27. The wheel cleaning composition of claim 25 wherein said scouring agent is present in an amount of from between 0.01 and 5.0 percent by weight.

Claim 28. The wheel cleaning composition of claim 1 including a dispersing and emulsifying agent.

Claim 29. The wheel cleaning composition of claim 1 wherein said dispersing and emulsifying agent is selected from the group consisting of trisodium phosphate, tetrapotassium pyrophosphate, sodium tripolyphosphate, sodium citrate, monosodium phosphate, disodium phosphate, sodium acid pyrophosphate, and combinations thereof.

Claim 30. The wheel cleaning composition of claim 29 wherein said dispersing and

emulsifying agent is present in an amount of to  
10.0 percent by weight.

Claim 31. The wheel cleaning composition of claim 29 wherein said dispersing and emulsifying agent is present in an amount of between .01 to 5.0 percent by weight.

5           Claim 32. The wheel cleaning composition of claim 1 including a effective amount of a compound to effect a bitter taste to the composition.

Claim 33. The wheel cleaning composition of claim 32 wherein said compound to effect a bitter taste to the composition is BITREX.

Claim 34. The wheel cleaning composition of claim 1 including a viscosity thickener.

10           Claim 35. The wheel cleaning composition of claim 34 wherein said viscosity thickener is present in an amount of up to 5.0 percent by weight.

Claim 36. The wheel cleaning composition of claim 1, wherein said viscosity thickener is ELFACOS CD481 (1%).

15           Claim 37. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 6,000- 15,000.

Claim 38. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 40,000 - 80,000.

20           Claim 39. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 240,000-

400,000.

Claim 40. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 240,000 - 400,000.

5 Claim 41. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 900,000 - 1,500,000.

10 Claim 42. The wheel cleaning composition of claim 1, wherein said polyvinylpyrrolidone comprises a molecular weight in the range of from between 2,000,000 - 3,000,000.

15 Claim 43. The wheel cleaning composition of claim 1, wherein said alkylated polyvinylpyrrolidone is selected from the group consisting of GANEX P-904L which is an alkylated PVP copolymer comprising 90% vinyl pyrrolidone and 10% of a C<sub>4</sub> %-olefins (1-butene), GANEX V-516 which is a alkylated PVP copolymer comprising of 50% vinyl pyrrolidone and 50% of an C<sub>16</sub> %-olefins (1-hexadecene, GANEX V-216 which is a alkylated PVP copolymer comprising 20% vinyl pyrrolidone and 80% of a C<sub>4</sub> %-olefins (1-butene), GANEX V-220 which is an alkylated PVP copolymer comprising 20% vinyl pyrrolidone and 80% of an C<sub>20</sub> %-olefins (1-eicosene), GANEX V-660 which is an alkylated PVP copolymer comprising 20% vinyl pyrrolidone and 80% of an C<sub>30</sub> %-olefins (1-tricosene), and combinations thereof.

20 Claim 44. The wheel cleaning composition of claim 1, wherein said poly(4-vinylpyridine-N-oxide is in a 40% aqueous solution, (product containing 40% active ingredient in a water solution).

Claim 45. The wheel cleaning composition of claim 1, wherein

said poly(4-vinylpyridine-betaine) has a molecular weight range of from between 15,000 and 200,000 (GPC).

Claim 46. The wheel cleaning composition of claim 1, including a cleaning additive selected from the group comprising  
5 lauroamphoglycerinatees and betaines.

Claim 47. The wheel cleaning composition of claim 1, wherein said scouring agent is present in an amount of up to 10.0 percent by weight.

Claim 48. The wheel cleaning composition of claim 1, wherein said scouring agent is present in an amount of up to 0.1 to 5.0 percent by weight.

10 Claim 49. The wheel cleaning composition of claim 1, wherein said composition prepared in a concentrate of from 0.01 to 10.0% (w/w) and diluted with water to less than 1% (w/w) for application to the surface of the wheel or tire.

Claim 50. The wheel cleaning composition of claim 49, wherein said composition prepared in a concentrate of from 0.01 to 10.0% (w/w) and diluted to a 1:3 ratio with water.

15 Claim 51. The wheel cleaning composition of claim 1, wherein said composition prepared in a concentrate of from 0.01 to 2.0% (w/w) and diluted with water to less than 1% (w/w) for application to the surface of the wheel or tire.

20 Claim 52. The wheel cleaning composition of claim 1, wherein said composition prepared in a concentrate of from 0.01 to 2.0% (w/w) and diluted with water to between 0.1 to 0.5% (w/w) for application to the surface of the wheel or tire.

Claim 53. A wheel cleaning composition, comprising an effective amount of a dirt

complexing polymer to complex with dirt particles is selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), and combinations thereof;

a surfactant;

5 a scouring agent;

a solvent; and

water.

Claim 54. The wheel cleaning composition of claim 53, wherein said surfactant is VERSENE 100 in an amount of from between 0.01 to 20.0 percent by weight.

10 Claim 55. The wheel cleaning composition of claim 53, wherein said scouring agent is sodium metasilicate pentahydrate in an amount of from between 0.01 and 10 percent by weight.

Claim 56. The wheel cleaning composition of claim 53, wherein said solvent is an alcohol in an amount of up to 50 percent by weight.

15 Claim 57. The wheel cleaning composition of claim 53, including a chelating agent for aiding in the removable of insoluble deposits of calcium and magnesium soaps and salts thereof.

Claim 58. The wheel cleaning composition of claim 57 wherein said chelating agent is ethylenediaminetetraacetic acid ("EDTA") and salts thereof.

Claim 59. A method of preparing a wheel cleaning composition comprising the steps of:  
preparing a solution of water or water and a polar solvent in a container;

20 agitating said solution;

selecting an effective amount of a dirt complexing polymer selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), and combinations thereof and adding same to said solution dispersing



same;

adding a scouring agent to said solution dispersing same;

adding a surfactant to said solution dispersing same; and

agitating said solution obtaining a homogenous wheel cleaning composition mixture.

5            Claim 60. The wheel cleaning composition of claim 59, including the step of adding a chelating agent and dispersing same for aiding in the removable of insoluble deposits of calcium and magnesium soaps and salts thereof.

            Claim 61. The wheel cleaning composition of claim 60 wherein said chelating agent is ethylenediaminetetraacetic acid ("EDTA") and salts thereof.

10            Claim 62. A method of preparing a wheel cleaning composition, comprising the steps of selecting an effective amount of a dirt complexing polymer selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), and combinations thereof and mixing said dirt complexing polymer together with an acid-based formulation in an aqueous solution.

15            Claim 63. A method of cleaning a wheel comprising the steps of:  
            applying a wheel cleaning composition comprising an effective amount of a dirt complexing polymer selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), mixed together with a scouring agent, a surfactant, and a chelating agent, and combinations mixed together in an aqueous solution  
20            by spraying said wheel cleaning composition onto a wheel or tire;  
            wiping with a cloth or sponge; and  
            rinsing said wheel or tire with water.

Claim 64. A method of cleaning a wheel comprising the steps of:

applying a wheel cleaning composition comprising an effective amount of a dirt complexing polymer selected from the group consisting of a polyvinylpyrrolidone, a poly(4-vinylpyridine-betaine), a poly(N-vinylimidazole, a poly(4-vinylpyridine-N-oxide), and combinations mixed  
5 thereof together with a conventional wheel cleaning agent comprising an alkaline-based formulation in an aqueous solution by spraying said wheel cleaning composition onto a wheel or tire;

waiting for 30 seconds; and

rinsing said wheel with water.

10 Claim 65. The method of cleaning a wheel comprising the steps set forth in claims 64 and 64 wherein wheel comprises aluminum, chrome, stainless steel, painted steel, painted aluminum, clear coated aluminum, plastic, fiberglass, and rubber.